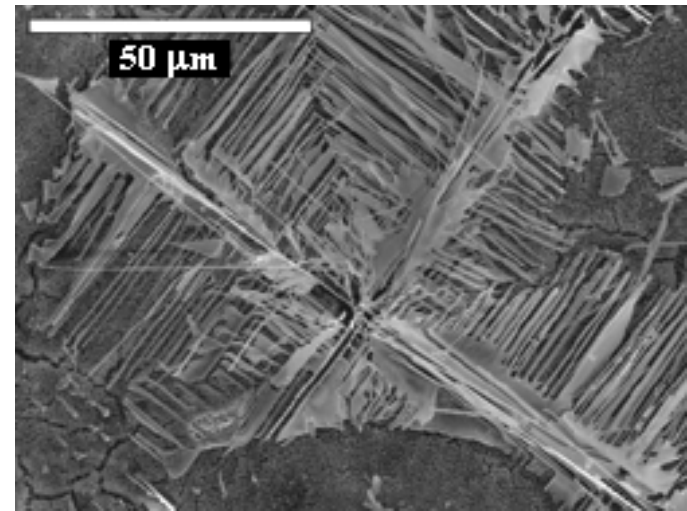


Stability of Ni-Based Superalloy Single Crystals (GOALI with Pratt & Whitney)

G.E. Fuchs, University of Florida, DMR Grant Number 0072671

- Graduated
 - 10 Undergraduate Students
 - 3 MS Students
 - 2 PhD Students
- 12 papers published
- 8 presentations at conferences
- 2 students given TMS Superalloys Scholarships based on work from this project.
- Results used in newly created “High Temperature Materials” course (EMA 6107) and revised “Advanced Phase Diagrams” course (EMA 6106).
- Results from this project assisted in development of several new proposals, including NSF US/European collaboration project recently selected for funding.



SEM micrograph of deep-etched carbon containing single crystal Ni-base superalloy with script-morphology carbides



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■ UF/Pratt & Whitney Interactions

- 5 grad/undergrad students completed 3-6 month long co-ops at P&W-East Hartford.
- 2 students hired by P&W.

■ Outreach

- Students visited local elementary schools to give presentations and demonstrations on materials science.
- Middle school students performed hands-on experiments to fulfill laboratory course requirements.
- Taught short courses at Siemens Westinghouse, Howmet and DNV.



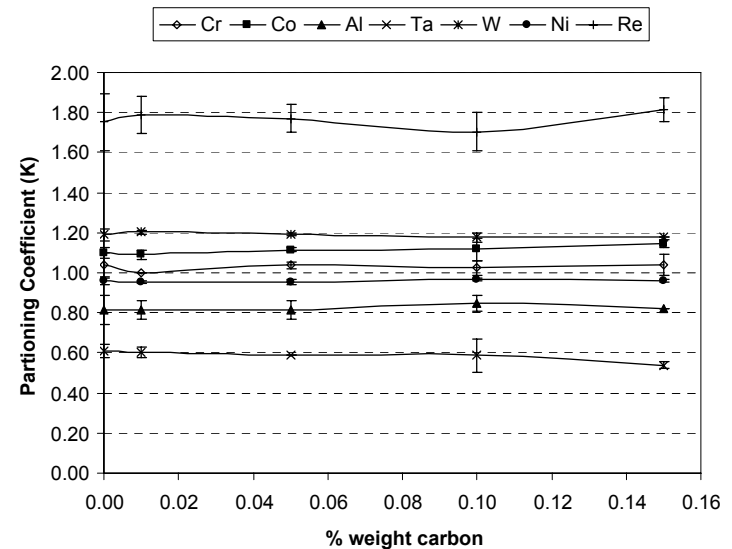
Dr. Kevin Jones (MSE – Department Chair) standing in PW4098 demonstration gas turbine at Pratt & Whitney – East Hartford during UF/P&W information exchange.



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- The stability and castability of Ni-base superalloys is a critical issue for the increased performance and efficiency of gas turbines.
- This project has provided a better understanding of the effects of alloying additions on castability and the effects of microstructural evolution on the properties of single crystals.
- A better understanding of the effect of composition on the castability of single crystal superalloys has also shown previous theories may not be correct.



Partitioning coefficient for each element in Ni-base superalloy (LMSX-1) as a function of carbon content, indicating that carbon additions do not affect segregation of the elements in the alloy.

